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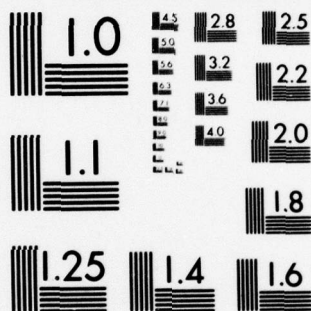
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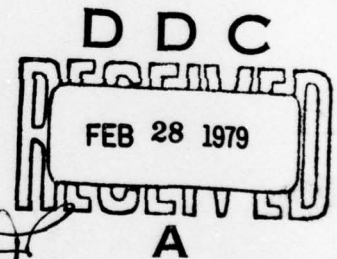
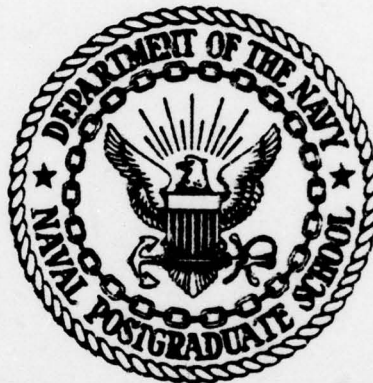
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THESIS

INCENTIVIZATION OF THE MASTER SHIP REPAIR
CONTRACT

by

Gerald Frank Hesch

December 1978

Thesis Advisor:

K. L. Patterson

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Incentivization of the Master Ship Repair Contract

by

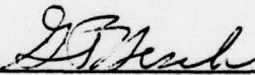
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Lieutenant, Supply Corps, United States Navy
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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the
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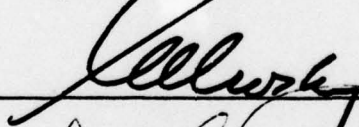
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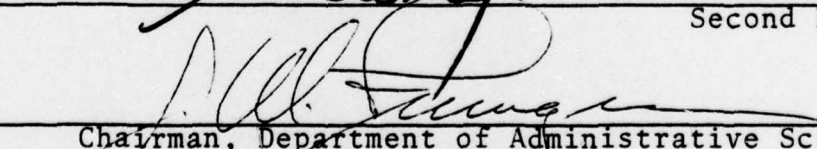
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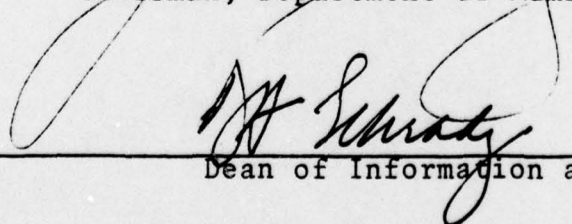


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ABSTRACT

This thesis is a study of various techniques which provide incentives for contractors for work under a Master Ship Repair (MSR) contract. These techniques are used to motivate the contractor to adhere to the original schedule without degradation of quality control when growth work or change orders entitle the contractor to an increase in price, changes in schedule, or both.

The methodology used to investigate these techniques was primarily personal interviews with Government and contractor personnel involved in the ship repair/overhaul industry and literature research.

The results of this study indicate contractors are incentivized to reduce schedule slippages by a process of: stabilizing regional workloads, supplementing training, coordinating conferences, increasing manning levels, and by changing certain milestone dates and work procedures. This thesis also proposes an award fee contract type which incorporates the above as an alternative to the contract type presently being used.

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I. INTRODUCTION

In today's world where management, both in the public and private sectors, is continually trying to optimize each dollar spent by maximizing the output from these expenditures, there comes a point where spending fewer dollars will not result in the most effective output, especially in the long run. This is particularly true when it comes to national defense. In the light of the problems with the shipbuilding industry with regard to claims and cost overruns, the United States Navy is required to maximize the effectiveness of the dollars it spends for repair (maintenance) of its vessels in overhaul because of increased scrutiny by Congress and the U.S. General Accounting Office (GAO). The Navy's maintenance programs provide for ships to be overhauled at regularly scheduled intervals for the purpose of keeping its fleet in a sound operating condition. The Master Ship Repair Contract (MSR) is an agreement between the Government and a contractor which states the terms and conditions in effect should the contractor be awarded a job order for repair work at a later date. The job order issued under the MSR is the instrument with which the Navy contracts with industry for overhaul and repair work. Job orders are awarded under the MSR by means of formal advertising or negotiation and are generally of a firm fixed price type. The method of contracting depends on the conditions surrounding each case. Once a schedule is established and the contract is awarded to a repair facility, the contractor has no impetus (incentive) to meet specific dates, such as Light

Off Examinations (LOE's) and delivery dates, should unforeseen requirements arise which may cause delays during the overhaul. The contractor is sincere when responding to the solicitation for repair work, but should "growth work" (new unforeseen work often found when equipment is opened, inspected and tested, or when new requirements are discovered) emerge, or if the Navy causes delays, the contractor has no incentive to meet the original or possibly even the revised scheduled delivery date. This is because the contractor knows the delays are not caused by his own actions and the contract will not be terminated. The contractor also realizes that if there is a slack work period following the instant contract, it is an advantage to prolong his effort. Therefore the longer this expertise is available, the more stable the work force will be; thus resulting in a better utilization of personnel.

It is important that U.S. Naval vessels adhere to repair schedules in order to meet future commitments. Also, it becomes of the utmost concern that contractors meet the original schedule and not sacrifice quality in this quest. Thus the purpose of this paper is to determine if Master Ship Repair contracts can be effectively incentivized so the contractor will meet the original scheduled dates and not forfeit quality work, when growth work or changes entitle the contractor to an increase in price or schedule or both.

It should also be pointed out, this paper develops a model to get the ship out of the shipyard on schedule despite the many reasons for delay which often arise during the repair period that cause delays.

The methodology used to develop the model which focuses on incentivization of a MSR, was primarily personal interviews and literature research. The interviews were conducted with Government personnel involved with procurement, especially those having experience in ship repair/overhaul. Ship repair/ overhaul contractors were also interviewed in order to provide insight into both sides of the repair problem. Additional research information was secured from journal and magazine articles, Government training manuals, instructions, circulars and periodicals, and Government memoranda and correspondence.

The approach used in this paper is to first provide a general background on the ship repair problem, followed by the objectives of this study and methodology used to develop an incentive model for ship repair (Chapter 1). Next (Chapter 2), the MSR contract concept will be explained as to its definition, purpose and general use. Chapter 3 provides information concerning the responsibilities and missions of the Naval Sea Systems Command (NAVSEA) and the Supervisor of Shipbuilding, Conversion and Repair, USN (SUPSHIPS) and the repair organization in general. Chapter 4 describes the purpose, measurement, and justification for contractual incentives in general concerns. Chapter 5 will present a preliminary hypothesis, research data, and an interpretation of the methods of analysis used in this study.

Finally, Chapter 6 will provide the conclusions reached by this analysis as well as tender recommendations.

II. MASTER SHIP REPAIR CONTRACTS

A. DEFINITION AND PURPOSE

The Master Contract for Repair and Alteration of Vessels is normally referred to as the Master Ship Repair (MSR) Contract. The purpose of this particular type of contract is to establish in advance the terms under which a contractor will effect repairs, completions, alterations (commonly referred to as repair work) and additions to vessels and repair parts needed to complete such work under the provisions of job orders issued by various activities (usually by the Supervisor of Shipbuilding, Conversion and Repair, USN (SUPSHIP)). Through the use of the MSR, administrative costs and efforts are reduced, the awards for repair work are expedited and contractors have an opportunity to bid on and perform repair work under common terms and conditions which are consistent and uniform.

In practice, the MSR is essentially an agreement between a contractor and a repairing activity which describes in advance the details and conditions that will be in effect, should the contractor be awarded a job order to accomplish a specific task. A unique facet of this contract is that a contractor which is awarded a MSR (DD Form 731) is not guaranteed work, nor is he qualified to perform every possible job order that will arise aboard a vessel, because repair work varies considerably in scope and in difficulty of performance.

It should be noted that a job order under the MSR cannot be used to purchase material or work which is not a part of the

vessel repair or overhaul package. This also pertains to:

"... alteration jobs requiring performance by MSR contractors which must have control of berthing facilities. Design, pre-fab work and material procurements are examples. The reason why the MSR contracts are not to be used are (i) that competition would be limited to only MSR contract holders who have control of berthing facilities, and (ii) the MSR contract terms are not designed for such procurements."¹

Other areas where MSR's cannot be used are:

- 1) Personal services.
- 2) Repairs to material in storage (spares).
- 3) Manufacturing when not part of a ship work job order.
- 4) Design work when not part of a ship work job order.
- 5) Towing or stevedoring when not included in the job order for repair of the vessel.
- 6) Procurement of material and cost of packing, crating or shipping material when not included in the job order for repair of the vessel.
- 7) Utility services when not incidental to the repair of the vessel.

Lastly, Master Contracts are entered into with contractors located within the United States. When dealing with repair in foreign countries, the MSR is used merely as a guide.

B. BIDS AND QUOTATIONS FOR JOB ORDERS

Whenever a specific work requirement arises which is covered by a Master Contract, bids or quotations on this effort will be requested from prospective contractors who have previously executed a Master Contract and also from contractors who possess the necessary prerequisites and consent to executing a Master

Contract before the issuance of a job order. The Navy relies on formal advertising of contracts to assure that the price for the repair and overhaul of its ships are fair and reasonable. This procedure is outlined in the Defense Acquisition Regulation (DAR) as well as in Chapter 7 of the Ship Repair Contracting Manual (Repair Manual). Chapter 7 of the Repair Manual also discusses when negotiation techniques will be the basis for the award of the job order. In the instance where a contractor is invited to bid, the contracting officer will provide as much detail as possible: i.e., as to the type of work which will have to be performed; the date the vessel will be available and the required date of work completion. Interested contractors will be allowed to inspect the work to be accomplished before they "submit a bid ... for the performance of the work in accordance with the invitation for bids ..." ²

After the bids or quotations are received and evaluated, and a contractor is selected, all pertinent data (including the price for the work) are set forth in a job order (DD Form 731-1). This job order is subject to the provisions of the Master Contract.

Some instances where a contracting officer can issue a job order "without inviting bids or requesting quotations" ³ are in emergency conditions - 1) when necessary repair work must be done immediately or the vessel, its cargo, or stores would be in danger, or, 2) when military obligations require immediate work to be done aboard a vessel. These changes are known as unpriced modifications or unpriced job orders. Job order modifications can be either bilateral or unilateral. Bilateral

modifications are those which have the signature of both the contractor and the Government on the document. DAR calls these types of modifications "supplemental agreements." This modification is generally pre-priced (i.e., the price is agreed upon before the performance of the work). A unilateral job order modification is an unpriced modification issued by the ACO or his designee. Here, the price is agreed upon after the work commences.

Oftentimes, accurate descriptions of work are not always available, therefore, as work progresses, the Navy is often required through an instrument called a contract modification to change the contract terms initially agreed upon. In many cases these modifications make up over half of the total contract value and are negotiated with the contractor doing the repair on a sole source basis.

"The Navy, therefore, generally loses any benefits that may have been obtained through the initial competition and is at a disadvantage when negotiating prices for modifications. ... therefore ... Private shipyards are not only familiar with how busy their competitors are but also generally know the prices at which they must operate. In short, shipyards -- are aware of how much competition exists, -- know that the fixed price of the original contract is not firm because it will be modified for substantial work that is unknown at the time of the award, and -- can anticipate negotiating many of these modifications with knowledge of actual costs which is not made available to the Navy."⁴

This illustrates the fact that the Navy is decidedly at a disadvantage when negotiating modifications because of the sole source situation.

C. MSR CONTRACT MODIFICATIONS

SUPSHIPS, which administers the MSR, has no authority to modify any clauses of the MSR Contract (See Appendix A for a list of the clauses), except at the direction of the Naval Sea Systems Command (NAVSEA) Deputy Commander for Contracts. This is to ensure uniform contracts and to keep job orders within the limits and boundaries of the MSR.

SUPSHIPS does have the opportunity to recommend to NAVSEA any changes or modifications which will help the administration of job orders. This type of recommendation is encouraged by NAVSEA to keep contracts current. Because of changes in statutes, executive orders and procurement regulations, the MSR will be revised periodically (but not more than annually) to incorporate any changes. Once the changes are made, all outstanding Master Contracts will be replaced by the amended version. This is done simply by issuing the revised edition of the MSR simultaneously with the cancellation of all existing MSR's.

D. CANCELLATION

If a repair facility is sold or undergoes a transfer of title, the MSR is not transferred, but is cancelled. Should the new owners desire a Master Contract, they will have to apply in accordance with current regulations.

A clause in the MSR provides that either party has the right to cancel the contract. It is NAVSEA's policy to cancel MSR contracts for the following reasons:

- "1) Bankruptcy.
- 2) Change of firm's name, management or owners.
- 3) Default under a job order.
- 4) Inclusion of Joint Consolidated List of Debarred, Ineligible and Suspended Contractors as outlined in Section 1, Part 6 of [DAR].
- 5) Removal or sale of facilities.
- 6) Revision of DD [DAR] Form 731.
- 7) No longer meets standards for award of the MSR Contract."⁵

A prescribed format for cancellation is applicable (Appendix 4-C of the Ship Repair Contracting Manual) and must be followed by both parties.

E. SUMMARY

"At the present time, the SUPSHIPS award contracts for ship repair and overhaul to the private shipyards ... using formal advertising procedures. However, the SUPSHIPS frequently find it necessary to negotiate change orders or modifications to the formally advertised contracts because all of the required repairs cannot be identified until the ship is "opened and inspected" to determine its internal condition. A ship's internal condition can vary for many reasons, including the length of service between maintenance intervals and the care exercised by the ships crew. The open and inspection procedures do not occur until after award of the formally advertised contracts."⁶

Overall, through the use of the MSR Contract, contractors have an opportunity to bid on vessel repair work, awards for the repair work are made more quickly, and administrative costs are significantly decreased. It is noted, the MSR is the system the Navy presently uses, but changes can be added to improve it. NAVSEA and SUPSHIPS are continually trying to promote an improved scheme. Hopefully, changes proposed by this thesis will be adopted and will result in an improvement of the present system.

III. REPAIR ORGANIZATION

Before explaining the intricacies of contract incentives, it becomes important to briefly describe the repair organization. The ultimate responsibility for the maintenance and repair of U.S. Naval Vessels belongs to the Chief of Naval Operations (CNO). "He formulates detailed strategic plans to carry out the missions assigned to the Navy by the Secretary of Defense."⁷ These plans include broad logistics requirements which are given to the several Systems Commands (SYSCOMs) for further procurement action via the Chief of Naval Material (CNM).

"He [CNO] approves the annual overhaul schedules for all fleet ships as recommended by NAVSEA and the Commanders of the Atlantic and Pacific Fleets. He also approves all overhaul schedules established by the District Commandants and by the Officers-in-Charge of Naval Inactive Ship Maintenance Facilities (INACT-SHIPFACs) for ships under their cognizance ...

[The] CNO is the ultimate approval authority for alterations which affect the military characteristics of ships. The SUPSHIP should request authority for alterations from the cognizant SYSCOM."⁸

The Naval Sea Systems Command (NAVSEA) is the SYSCOM from which SUPSHIPS receives its authority. NAVSEA's mission is to provide material support for Navy and Marine Corps ships and crafts, the shipboard weapon systems and components plus the missiles, ammunition, mines, torpedoes, and all other surface and underwater expendable ordnance.

"NAVSEASYSKOM is responsible for the research design, development, logistics planning, test, technical evaluation, acquisition, procurement, contracting, production, construction, manufacture, inspection, fitting out, supply, maintenance, alteration, conversion, repair, overhaul,

modification, inventory management, and advance base outfitting of naval material ..."⁹

NAVSEA acts as the Coordinator for Shipbuilding, Conversion, and Repair for the Department of Defense (DOD). SUPSHIPs, the contract administration component of NAVSEA then administers:

"... Navy Department and other Department of Defense shipbuilding, design, conversion and facility contracts at assigned private shipyards; procure[s] and administer[s] overhauls, repairs, alterations, activations performed on naval ships at private yards under Master Contract for Repair and Alteration of Vessels; ..."¹⁰

Thus, SUPSHIP's contracting officers are authorized to use the MSR Contracts (which NAVSEA has awarded) via job orders, on behalf of the Government. SUPSHIPs also administers these contracts and job orders. Of course, SUPSHIP's authority is limited by DAR, Naval Procurement Directives (NPD), the Ship Repair Contracting Manual (Repair Manual), and the requirements and limitations imposed by the appointing authority. SUPSHIPs acts as a "procuring contracting office for purposes of placement of the MSR contract, and award of job orders thereunder by formal advertising or by negotiation."¹¹ SUPSHIP is a member of the Contract Administration Services (CAS) and carries out the contract administration functions listed in DAR 1-406 and 20-704 to:

"... the extent applicable to the MSR Contract and job orders and to other contracts assigned at commercial shipyards under his cognizance, as listed in the DOD Directory of Contract Administration Services Component (DOD 4105.59H)."¹²

A. REPAIR PLANNING

Having established that SUPSHIP is a major component of the repair organization, it is now important to describe how an

overhaul is planned. OPNAVINST 4700.7E is the basis upon which NAVSEA proposes overhaul schedules. NAVSEA forwards these schedules to Fleet Commanders (FLTCOMs) and Type Commanders (TYCOMs) for review. The FLTCOMs return the schedules, with comments, and a mutual agreement is then reached regarding the proposed schedule. This revised schedule is then sent to the CNO for final review and for publication. 540 days prior to the overhaul, NAVSEA sends an advance planning letter and the TYCOM sends an authorization letter to SUPSHIPS which describes what work is to be done onboard the vessel during overhaul. This work is described in terms of NAVSEA Title K SHIPALTS (Ship Alteration under the cognizance of NAVSEA) and TYCOM Title D SHIPALTS (alterations equivalent to a repair which are funded by the TYCOM).

During time A-510 (510 days before the commencement of the repair overhaul), NAVSEA and the TYCOM fund the industrial activity (SUPSHIP) to perform the overhaul work designated in the planning and authorization letters.

At A-405, long lead time items are ordered. This would concern material or design items which require six months or greater to acquire.

After some pre-overhaul tests and inspections, a ship alteration and repair package (SARP) is prepared (approximately 270 days before overhaul commencement). The SARP will be the basic screening action which will denote who will accomplish the work (whether the ship's force, the intermediate maintenance activity (IMA), or the shipyard).

NAVSEA forwards SUPSHIPS a letter that describes exactly which K SHIPALTS will be accomplished. A work definition conference (WDC) is held (6 months prior to overhaul commencement) with members of the ship, SUPSHIPS, and the TYCOM which finalizes the work package that will be bid upon.

An invitation for bid (IFB) is next sent out to the repair activities which have the capability to perform the required work. Often these work packages are split between contractors. The reason for this is that in many cases repairs to a vessel must be performed which will require drydock facilities. In such cases, adequate competition may often be difficult to achieve, since relatively few ship repair firms possess such facilities. By splitting the work package (split bidding) maximum competition may be obtained. Under split bidding procedures, drydock and topside work are separated and established as individual lots. While competition for the drydock portion may be limited, competition for topside work will be opened to many additional firms; as a result, lower prices may often be obtained for this portion of the work. By splitting the work package, the Contracting Officer ensures increased competition in a situation where it would otherwise be impossible. After a bidders conference and a bid opening, an award is made and the ship is ready to be overhauled.

The award is made on a firm fixed-price basis. Even though the SUPSHIP Contracting Officers must not get "involved" with a MSR contract with respect to the contractor's costs to the extent required by a cost type of contract, they still must get intimately involved with respect to the job order's specified

completion date. To comply with this, the contracting officer and his delegates must have an intimate knowledge of the contractor's actions and operations. This knowledge can be more easily secured if the following actions are accomplished:

- 1) Become knowledgeable about the contractor's Work Breakdown Structure (WBS) which covers costs and schedule.
- 2) Use Gant, PERT or CPM charts to plot the progress of the work and to see where possible "backlogs" to the system will occur.
- 3) Maintain records of job order performance so that deficiencies will continually be followed-up and feedback provided to the system.

Through this strategy, SUPSHIPS can monitor a contractor's performance. By advising the contractor of deficiencies in writing, the contracting officer is stating that adequate quality standards are not being followed.

Schedule delays sometime ensue because the contractor does not always feel compelled to speed up the operation to make up for lost time for delays generated by the Government. It is true that the contractor will try to meet the original schedule, but what penalty does the contractor suffer if he does not meet the original schedule? If there was a large amount of growth work, none, except for a loss of pride. The contractor can attribute the delay to growth work or disruptions caused by the growth work. The strategy must be to motivate and inspire the contractor to perform quickly and correctly and ensure quality. To accomplish the above is the primary reason for incentivizing

a contract. Chapter 4 will explain how incentives are designed to function and how the MSR can be changed to assist the Government in achieving its goals.

B. SUMMARY

As was pointed out, the repair of a vessel is not an overnight undertaking. Much time, money and effort is continually being input into this process. Despite the careful planning which starts years before the overhaul, major difficulties are encountered in meeting scheduled milestones. With the detailed planning schedule as described, the problem concerning schedule slippages is centered about the work generated during the overhaul, and not the work cited previous to its commencement. This supports the idea that growth work is a major contributor to schedule slippages.

IV. CONTRACT INCENTIVES

A. INTRODUCTION

Incentive contracting is not new to Government procurement. As far back as 1861 incentive provisions were used when the Norfolk Naval Yard built the Monitor. Payment was to be made only if the Monitor floated, attained a minimum speed, and won its first battle. Even though the battle between the Monitor and the Merrimac ended in a draw, the contractor received full payment. Approximately sixty years later, the first military airplane was procured from the Wright Brothers under an incentive plan. This contract contained incentives based on the performance criteria of air speed. The Wright Brothers exceeded the target speed of forty miles per hour and received a bonus of six thousand two hundred and fifty dollars. This technique was the beginning of using a stimulus of additional money to get a desired action.

In the early 1960's the Department of Defense (DOD) initiated several cost reduction programs. The increased use of incentive contracts (which was supposed to increase contractor efficiency) was a vital part of this effort and was stressed by then Secretary of Defense McNamara. The use of incentive contracts is considered by many government officials to be the most effective component of the cost reduction program.

The Department of Defense has again increased their emphasis of using contractual incentives to increase the efficiency of contractors. This is especially true when relating the

contractor's profit or fee to his success in meeting schedules and satisfying performance requirements. The word "incentive" will be used exclusively in this paper to refer to contractual provisions which relate contractor profit or fee to actual contract cost, time of completion, or level of performance achieved. "Performance" will refer to the quality and capability of the product designed, developed or delivered rather than to the ability of the contractor as a manager. Finally, "product" will be defined as the completed hardware (whether repaired or created) which resulted from the contract.

B. PURPOSE OF INCENTIVES

Originally incentives were used by DOD as a means of reducing system acquisition costs. Eventually, however, other benefits could be recognized. The DOD Incentive Contracting Guide states: "Incentive contracting is used to increase technological progress and produce cost savings."¹³ By this is meant that a contractor is more likely to maintain or increase the state of the art of an engineering or production capability if contractual incentives are provided which improve the contractor's prestige and the nation's technological base. As was pointed out in the study "An Examination of the Foundations of Incentive Contracting" (which was sponsored by the Assistant Secretary of Defense, Installations and Logistics), the following are generally considered the primary justifications for incentive contracting:

- " ... (1) Incentives motivate efficient contract management and achievement of a high performance product.
(2) Incentives enable the Government to reward contractors on the basis of demonstrated management ability and product performance.
(3) Incentives assign to the contractor a larger portion of contract risk than he would bear with a CPFF [Cost Plus Fixed Fee] contract.
(4) Incentives provide explicit communication of the Government's contracting objectives."14

This study stated that incentives are just not a means of monetarily rewarding a good contractor and penalizing an inferior one, but also a means of effective communication. "Penalties are of minor consequence unless they stimulate improvement or discourage a company from seeking DOD business for which its competence is questionable."15 Therefore, incentives (whether positive by providing rewards or negative, by punishment) must be regarded as mediums to motivate or catalysts for the procurement system. In a simpler format, the purpose of contract incentives is to motivate the contractor to produce a system that will meet or surpass performance goals. The profit motive is the essence of incentive contracting. For the reasons cited in preceding paragraphs, incentive contracts must be structured to reflect profit incentives in such a way that when the contractors maximize profit it is in the best interest of the Government in that the planned objectives of the Government are achieved. Mr. Leonard M. Freeman of the Marshall Space Flight Center described it perfectly when he said:

"The correct definition of incentives is 'that which incites or tends to incite, to determination or action'. The proposition of inciting to action is basic; a reward, or negatively stated, a penalty, which anticipates no action is not an incentive. Rewards and penalties become incentives when they are correlated with the expectations of organizations and ultimately individuals with certain definite actions or levels of action. Incentives for efficient contract performance exist when contractors expect that efficient performance will be rewarded more than lackluster performance, and conversely, that inefficient performance will be penalized."¹⁶

C. MEASURING INCENTIVE EFFECTIVENESS

To measure the effectiveness of an incentive, the result of the contract cannot just be assessed. The key point to remember is to determine what would have been the results if the incentive was not used. The contractor will try to maximize his profit or fee and be more cost-conscious if more of his own money is at stake. "It is equally important to acknowledge, however, the extent to which other objectives of the contractor may conflict with and perhaps take precedence over his emphasis on low cost."¹⁷ Much study has been done concerning this very subject. There is practically a consensus among analysts and managers that:

"... in the short run, contractor management does sacrifice short-run profit on defense business in favor of achieving

- (1) company growth
- (2) increased share of the industry market
- (3) better public image
- (4) organizational prestige
- (5) carry-over benefits to commercial business (commercial spinoffs)
- (6) greater opportunity for follow on business
- (7) greater shareholder expectations for future growth and profit."¹⁸

As is evident from the preceding list, contractor management relates each contract to overall business objectives. To the extent that incentives promote the Government's interests, then incentives are useful. It must be kept in mind, though, that other contractor objectives may conflict with and take precedence over various incentives available to him. Before incentives are negotiated, it would be advisable to confirm that "motivational forces" already exist in the contractor's behavior before an incentive-type of contract is offered. More plainly spoken is whether the contractor will respond to added profit or fees. If it appears that incentives will not motivate the contractor, why get involved with the added monitoring caused by incentive contracting? In that instance, use a firm fixed-price contract.

D. INCENTIVE JUSTIFICATION

In 1967, a study was conducted strictly with procurement (contracting) personnel to see what they felt were the primary reasons why incentives were used in contracting. The following bases were given:

- "(1) to encourage cost control
- (2) to encourage control of schedules
- (3) to encourage improvement in product performance
- (4) to promote more efficient allocation of resources
- (5) to provide contractor management with tools to motivate workers
- (6) to obtain optimum trade-offs among cost, schedule, and performance
- (7) to obtain optimum trade-offs among performance goals
- (8) to effect future pricing based on actual accomplishment

- (9) to avoid CPFF contracts when FFP agreements are not feasible but the contractor will accept some responsibility for cost overruns.
- (10) to achieve contractor assumption of a large share of the risk associated with undertakings.
- (11) to force government personnel to state contract objectives more explicitly
- (12) to assure clear communication of government objectives
- (13) to attract contractor management attention to key objectives
- (14) to avoid stating firm requirements when there is insufficient knowledge for such statement
- (15) to prevent "frozen" design
- (16) to assure that acceptance tests will be included in contracts and subsequently will not be waived
- (17) to assure attainment of minimum specifications
- (18) to discourage "buy-in"
- (19) to serve as a compromise with contractors who demand escalation clauses
- (20) to justify higher profits or fees
- (21) to obtain desired pricing data
- (22) to give contractors protection against the Renegotiation Board
- (23) to conform to DOD policy"19

After examining the preceding factors, it becomes readily apparent that the people who award contracts, feel that incentives do help the Government save money, improve contractor efficiency, and produce a higher quality product. Items number 16, 17, 19, 20, 21, and 22 in this writer's opinion are weak supports for the use of incentives. However, this information was taken from a survey which enumerated all ideas given by the sample population and did not make value judgements and eliminate ideas the researchers felt weren't appropriate or worthwhile.

E. SUMMARY

The author feels the following:

"From their inception to the final published ASPR [DAR], the incentive contract was developed and structured with specific goals in mind. Among these goals were efforts to produce cost consciousness in defense contractors in the performance of government business."²⁰

The required result is a motivated industry which exhibits effective and economical performance in the best interest of national defense.

V. EXPERIMENTAL PROCEDURE

A. INITIAL ANALYSIS

As mentioned in previous chapters, the MSR uses firm fixed-price (FFP) job orders. This type of contract is characterized by requirements for the contractor to meet minimum standards of performance, a price which represents full payment for the work, and a delivery date at a specified time. The FFP places the greatest amount of risk in the hands of the contractor and is the easiest contract for the Government to administer since contract costs are not monitored.

But if the object is to motivate the contractor to meet initial delivery schedules through the use of an incentive contract, then it is most important to first ascertain which type of incentive contract is most suited for, and useful with, the overhaul procedure. The incentive contracts which are currently in use are:

- 1) The cost-plus-fixed-fee (CPFF) contract.
- 2) The cost-plus-incentive-fee (CPIF) contract.
- 3) The cost-plus-award-fee (CPAF) contract.
- 4) The fixed-price-incentive (FPI) contract.

The CPFF is appropriate where cost and technical uncertainty exists and where a level of effort is required. It is not used when preliminary studies show a high degree of probability that the system or component can be developed.

Since costs will be reimbursed by the Government, the contractor has less incentive to control the cost of the contract

than with other types of contracts. As Belden and Cammack state in their work Procurement: "There has been a distinct shift from these instruments [CPFF Contracts] to fixed-price and price incentive formulas."²¹

CPFF pricing arrangements provide relatively weak inducements for contractors to control costs or improve performance; in fact, CPFF contracts may motivate contractors to increase costs up to a specified maximum amount beyond which the Government will not be obligated to reimburse the contractor. Because an increase in cost (up to the ceiling) does not reduce the contractor's fixed fee (although it does reduce profit on sales), there is less financial risk to the contractor and "less incentive for cost control than in any other type of contract."²² This is particularly true in a situation where a contractor has excess capacity.

As Mr. Mundhenk addresses in his work, Incentive Contracting by Money and Methods, the CPFF is considered to provide the contractor only a "minimum incentive for effective management control of cost"²³ and designed chiefly "for use in research or exploratory development when the level of contractor effort required is unknown."²⁴

Because of the aforementioned limitations, plus the fact that this type of contract will require more SUPSHIP and Defense Contract Audit Agency (DCAA) personnel, this contract will not be discussed further.

The CPIF contract is a cost reimbursement type contract with an incentive formula for establishing final fee.

"Under this type of contract, the Government and the contractor agree, at the time negotiation of the contract [occurs], upon the target cost of performance. The target fee is then determined in relation to the target cost. Also established are minimum and maximum fees and finally, a fee adjustment formula."²⁵

This type of contract is designed primarily for procurement of development and test requirements, "... where, for example, the Government has determined that development of a weapon system is highly probable and feasible ..."²⁶ This contract is designed for situations where the risk is unacceptably high for a fixed-price type of contract, but not high enough to justify a CPFF contract. CPIF contracts have been used in the procurement of advanced, engineering, or operational systems development and first production.

Once again, this type of contract is not conducive to motivating the contractor in the overhaul scenario.

The last of the cost-type incentive contracts is the CPAF contract. In terms of risk, this contract falls between a CPFF and a CPIF contract.

"Its potential lies in procurement for term level-of-effort contracts, including R & D programs for which the performance characteristics and requirements are not sufficiently clear or definite at the start of a project to use a standard incentive type contract."²⁷

Under this type of contract, a contractor is reimbursed for allowable and allocable costs. The contractor receives a fixed fee for work performed (generally about three per cent of costs), and then may earn an additional award fee which is determined subjectively by Government personnel on the basis of periodic,

after the fact evaluations of the contractor's performance on the basis of criteria established in the contract. Typical major criteria are the performance of operations, technical management, and utilization of resources. Subfactors within these criteria often include quality, timeliness, and economy of performance.

"Originally used for level-of-effort contracts, this contract type has been expanded to include nonpersonal and support services including the procurement of operation, maintenance, logistic, and engineering services."²⁸

This type of contract affords great flexibility in that it provides for variability of potential fee based on subjective evaluations of actual performance. In many instances, it is this fee which furnishes a stronger motivational effect in comparison to the remaining cost-type contracts.

Specific benefits resulting from the use of CPAF contracts include better communication between the Government and a contractor, greater latitude for the contractor in control of his personnel and activities, and "better work statement definitions."²⁹

"The purpose in applying the award fee incentive is to obtain better performance from the contractor than could logically be expected with other contractual arrangements."³⁰ This statement made by Major Jerry V. Brown in his work The Award Fee Incentive: Management Considerations Regarding Its Application to Research and Development Contracts, plus information concerning CPAF contracts provided in previous paragraphs help support the possibility of using some form of an award fee

contract (and not necessarily a CPAF contract) to incentivize a MSR contract. This idea will again be addressed after the discussion of the FPI contract.

In the FPI contract, a target cost, a target profit, a price ceiling (but not a profit ceiling or floor) and a formula for establishing final profit and price are included. Using the target cost as a base, target profits are estimated by multiplying the target cost estimate by a specified proportion. Also, if the actual costs are less (or more) than the estimated cost, the Government shares in the contractor's "incentive" profits (or losses). The extent of the sharing is shown in the contract by a fixed proportion which, when multiplied by the profits or losses, represents the firm's share; the remaining portion is the Government's share. Thus, both the Government and the contractor share any differences that occur between actual and target costs.

"The rationale for this type of contracting is that the contractor will constructively attempt to reduce costs, make a better product, or expedite production if he can share in cost savings and realize a profit from his superior performance."³¹

The FPI contract is appropriate when the use of the FFP contract is inappropriate and the program is of such a nature that the assumption of a degree of cost responsibility by the contractor is likely to provide him with a positive profit incentive for effective cost control and contract performance. Contract performance requirements must be such that there is reasonable opportunity for the incentive provisions to have a meaningful impact on the manner in which the contractor manages

the work.

Even though a FFP contract can be classified as an "appropriate" contract in the ship overhaul industry, it still does not motivate the contractor to increase his "work pace" to meet changes in schedule caused by growth work. Here then, the degree of "appropriateness" comes into play and an FPI contract may help to "expedite production" if the contractor may share in the savings and realize a profit.

B. INITIAL HYPOTHESIS

Considering the initial information obtained, it becomes apparent that an FPI contract or some type of an award fee contract may be a possible solution to the delivery problem. The FPI and the CPAF contracts can be used with the incentives linked to the milestones of each overhaul. This will allow the contract administrators to use the monetary incentives to motivate the contractors to adhere to delivery schedules. Also a new contract type will be considered, a fixed-price award fee (FPAF) contract. This hypothesis is proposed under the assumption that the added administrative cost of incentivizing a MSR contract, although more than the present cost to administer FFP type contracts, is still less than the cost of:

- 1) keeping a ship in overhaul longer than necessary,
- 2) the cost of keeping a ship's crew in the yards when they would be better utilized performing their functions on an operating ship, and,

3) the loss in morale of the ship which has to stay out on the line at sea because the "relief" ship is extended in the yards.

Another assumption which is made is that NAVSEA and the TYCOM would be willing to fund the added costs of incentives for the reasons cited in the preceding lines.

C. DATA COLLECTION

In order to validate the initial hypothesis, interviews were conducted with Government personnel involved in the acquisition process to obtain their ideas regarding a possible solution to the acquisition of the repair effort. The majority of the interviews were with U.S. Navy personnel involved in the ship repair industry. Other individuals were interviewed from another service who had experienced similar "growth work" and schedule problems when repairing major weapon systems. Ship repair contractors were also interviewed in order to receive an appraisal of the present repair system and invited their opinions about incentivizing the MSR contract. The detailed results of those inquiries will be discussed later.

The structure of the interviews was to first discuss the problems associated with the ship repair industry (to build a scenario) and then pose questions to see their view of the situation. The answer to the first question will be from all the people interviewed as summarized below.

It is important to apprise the reader that comments will be presented by the writer after each response. These comments

are solely the opinion of the writer and are not intended to apply to every possible situation.

1. Incentives

Question. Do you feel that if the present MSR contracts were incentivized, contractors would be able to deliver ships in overhaul on schedule (or ahead of schedule) despite the fact that "growth work" indicates that delivery dates will not be met?

Of the 23 people interviewed, 57% believe that incentives will solve the problem, 22% believe that incentives will not work, 8% believe incentives are not necessary in the ship repair industry, and 13% were undecided whether incentives would be a feasible solution.

A further breakdown of the above question shows: that among the Navy personnel interviewed, 60% believe in incentives, 27% do not, and 13% are undecided; that among the contractors interviewed, 33% are for incentives, 17% are against, and 50% believe incentives are not necessary and the system works well as presently created.

It is obvious that the Navy personnel involved with the ship repair industry believe that the contractor must be motivated to complete his work. The implausible factor regarding the contractor results is that only 33% of the contractors interviewed were of the opinion that incentives would motivate a contractor and surprisingly, 50% said that incentives are not needed.

a. Personnel of the opinion that the MSR contract can be incentivized expressed the following views:

- (1) Contractors are not always motivated by a FFP contract. Schedule deadlines and pressure by the Government are often inadequate to influence the repair facility to "speed up" its operation, especially if the delays can be construed as "Government" caused. The motivation problem is often compounded by the fact that the firm may be in a slack work cycle or the contractor refuses to incur the added costs of overtime.
- (2) Incentives will give leeway to the contractor to make trade-off decisions.
- (3) A certain percentage increase in profit may be less costly to the Government than the present system.
- (4) In the absence of a stabilized workload, incentives may be the only means a contractor will have to be able to obtain a realistic profit.
- (5) Incentive type contracts will eliminate some of the extreme cases of ruthless bidding by contractors.

The arguments in favor of incentives serve that purpose except for item 1.a(5). The writer is of the opinion that "ruthless" bidding does not occur. The reason for this opinion is that bid competition is motivated by the individual contractor's capability and work load, and not by conscientious

attempts by certain contractors to destroy the market by "ruthlessly" bidding and undermining competition.

b. Personnel of the opinion that the MSR contract cannot be incentivized expressed the following views:

- (1) There will be a problem with administering incentive contracts since the people presently employed have been using a FFP contract and must be re-trained to cope with a new contract type.

This item raises a valid point (which was raised in a previous section of the paper) regarding the added personnel necessary to administer an incentive contract. After discussing this detail with various people assigned in contract administration capacities, it was assured that this problem could be overcome with a few additional people for the contract review.

- (2) Specifications are often poor and inadequate. The contractor will not be able to respond to an incentive until the specification packages are better prepared. The contractors themselves voiced this same view.

The above cites inadequate specifications as a reason not to use an incentive. Specifications should always be submitted in the best possible format but better results might be achieved in instances where specifications are lacking, by use of an incentive-type contract. The respondent answers provide a reason for issuing an incentive contract and not a reason used against this type of contract.

- (3) The large amount of paperwork presently required by the system will be compounded and beyond the control of the contractor.

This response does signal an area in which the Government can assist the contractor; namely, the elimination of paperwork which is not essential for the supervision of an overhaul. This point can be used as a basis for another study in the future.

- (4) The varying amounts of growth work make incentives unrealistic.

The above has a certain amount of truth to it, especially when considering an overhaul which experiences fifty per cent or more in growth work. The goal of incentivizing the MSR with respect to schedule is to motivate the contractor to finish on schedule, despite the growth work.

- (5) Incentives will not work as long as the contractor's hands are tied regarding assigning schedules.

Saying incentives hinder adherence to schedules is actually a weak reason. The purpose of the incentive is to have the contractor meet the assigned schedule or other objective. This fact was brought up by a contractor simply because it was felt that contractors are not given enough time to complete the contract. It is highly unlikely that contractors will continually become involved with contracts which the contractor feels cannot be accomplished in the time provided. This may occur

occasionally, but not all the time. It is assumed that Government contract administrators endeavor to authorize the correct amount of time which is necessary to accomplish the work.

- (6) There are too many variables and unknowns in the repair industry to definitize an incentive contract.

The above lends itself to supporting, instead of refuting incentive contracts. Because of the number of variables and unknowns, incentives can be used to allow the contractor to make trade-off decisions.

- (7) Since milestones are logical candidates to be incentivized, it will be difficult to state how the incentive system will work after the first milestone is not met.

The above is true if milestones are incentivized. If the contractor can miss some of the initial milestones, but still get the ship out of the yard on time, or ahead of schedule, the contractor still deserves an incentive.

- (8) There is a manpower limitation. Some SUPSHIP repair activities are not now presently manned to handle any incentive type contract.

Manpower limitations can be resolved by adding extra personnel to the rosters of needy SUPSHIP activities. This anti-incentive reason can be overcome (although with possible difficulty in gaining ceiling additions).

- (9) Auditing costs for incentive contracts are too high.

The writer is of the opinion the above is correct when considering contracts for research and development, but the auditing costs may not be excessive when considering ship repair (i.e., the work done is usually known). Presently, each SUPSHIP activity does have a number of auditors assigned to each contractor to administer and audit the individual contracts.

- (10) Small repair activities are not organized to work with an incentive contract. It is difficult to talk contract theory to a small business when their main concern is cash flow to keep the business as an ongoing concern. Small contractors will require more sophisticated contracting, cost records, pricing and estimating systems.

The above is a good reason for not incentivizing.

- (11) Incentives will not always work because the contractor may sometimes find himself in a situation where the added cost of overtime far outweighs any possible incentive.

The above will be true at times, although overtime for growth work is presently added to the cost of the contract.

- (12) It is sometimes questionable whether adequate time is offered to the contractor to complete

on time, due to delays in approving changes or disruption in other forms. This disruption is used by the contractor in support of his claims and would be used as a factor, by the contractor, if the incentive was withheld.

The writer feels the above is the heart of the MSR problem. When changes are issued, the contract changes and so do the milestones. What the Navy wants to be able to do is to issue changes and have the contractor meet the original schedules, regardless of the number of changes. Possibly this disruption can be overcome if large enough incentives are offered to the contractor and all milestones are not incentivized.

2. Fixed Price Award Fee Contracts

Question. Realizing that growth work exists, and that it may increase the original effort by as much as 50 to 60 per cent during an overhaul, do you feel a Fixed Price Award Fee (FPAF) contract will resolve the problem (i.e., the delivery schedule)? Bear in mind that the award fee would be based strictly upon the ability of the contractor to meet or beat the scheduled delivery date of the ship as well as the contractor's performance.

To this question, the U.S. Navy personnel (that believe in incentives) were 22% in favor of a FPAF, 33% against, and the remaining 45% were classified as undecided, (but acknowledged that it possibly may work).

a. Specific comments addressed to this new type of contract are as follows:

- (1) A FPAF contract would be hard to administer.
- (2) This type of contract would have the advantage of working at two levels -
 - (a) for total management of the activity.
 - (b) for total management of the changes.
- (3) The U.S. Navy contracting officials can then take growth work into consideration when the contract is awarded, and not after the award.

Contractor's responded to the question with 50% definitely stating it will not work and the other 50% leaning toward the idea but were not sure of its consequences.

Responses by Navy personnel who were in favor of a FPAF contract are self-explanatory. Although difficulty of administration does seem to be a problem because a FPAF is a new type of contract, the award fee would be the only item to be administered which was not previously administered under the FFP contract. The award fee can be made to be dependent upon performance or schedule or both. Since most contractors try to do the best job possible with respect to performance, meeting "scheduled dates" can be the sole measuring devices for the amount of award fee to be given to the contractor. In this instance then, contract administration would not be that difficult or taxing.

3. Fixed Price Incentive Contracts

Question. Despite the growth work, do you believe a FPI contract which incentivizes schedule and performance will motivate contractors to deliver ships on schedule?

Of the U.S. Navy people affirmatively responding to incentives, 11% accepted the idea of a FPI contract, 33% rejected it, and 56% were undecided. The contractors felt more strongly about the subject and 100% of the contractors who liked incentives, felt an FPI contract would not be successful.

a. Specific comments addressed to this type of contract are as follows:

- (1) A FPI contract does not assume numerous changes. Once the growth work reaches the 5% level, the incentives would be lost.

The above response is correct in theory but can be remedied if milestones are renegotiated after changes are submitted.

- (2) A FPI contract does not allow the contractor any trade-offs.

The contention that a FPI contract can limit trade-offs is acknowledged.

Despite the fact that a FPI contract is presently being used in the overhaul of the 1052-Class Frigates, some negative arguments were raised. This is probably due to the fact that the FPI contract is relatively new to the overhaul process and has not received wide acceptance or exposure.

4. Add-On Contracts

During early deliberations with Navy personnel, a new idea was brought into the discussion which was discussed with all respondents. It led to the next question.

Question. Do you feel that if a contractor was awarded a contract for an overhaul of a ship and was guaranteed to repair another ship if the contractor finished the first ship by a certain date, the contractor would be motivated to get both ships out on time, despite growth work?

Navy personnel answered this question with a response of 11% for, 33% against, and 56% undecided. Once again, the contractors' response was 50% for, and 50% against the idea.

a. Specific comments addressed to this concept are as follows:

- (1) An "add-on" contract may eventually cause TYCOM funding problems, since the funds will not be set aside for the added overhaul that may not occur on schedule (if the contractor does not get the first ship out on time).
- (2) A similar idea has been tried with the learning curve as the main reason for its usefulness. If a contractor keeps the same work force and is continually awarded job orders for the same types of ships, it is anticipated that the workers will experience a "learning process" whereby repeated work on "like" equipment results in improved work in a shorter time period. Experience proved that the ships still did not meet scheduled milestones in each overhaul. Further research shows that Planning and Engineering for Repair and Alterations, Combat Support Ships PERA(CSS)

conducted a study for NAVSEA to determine if multiple ship overhaul contracts (add-on contracts) are beneficial to the Navy. The U.S. Navy Minesweeper (MSO) was the ship type studied. The results of the analysis indicated that consecutive overhauls may be beneficial to the Navy. Further research of this idea with various NAVSEA personnel, confirmed the fact that consecutive overhauls may work with small ships of limited complexity, but may not work with larger ships containing more sophisticated equipment. This idea (multiple ship/add-on contracting) is again being observed by higher authorities as to its usefulness. Additional study will be conducted in this area to see if contractors will experience a learning curve and subsequent decreasing costs.

b. Other ideas which were discussed in the interviews with U.S. Navy personnel but were not covered under the previous topics are as follows:

- (1) The MSR should be modified to allow the Procuring Contracting Officer (PCO) to determine the type of job Order (i.e., FFP, FPI, etc.) under the MSR.
- (2) A CPIF contract should be used with heavy emphasis being placed upon delivery

(schedule) as well as cost and performance (multi-incentive).

- (3) The contractor should develop his own specification package to eliminate delays caused by faulty specifications.

All three arguments are items with merit and can be used (both totally or in part) as possible solutions to the present overhaul problems with schedule or work delays. It should be noted that CPIF contracts are being used. The results are quality repairs, cost underruns but the majority of the ships do not complete the overhaul on or ahead of schedule.

5. Contractor Responses

Additional questions were posed to the contractors to see what factors motivate their respective companies and what alternatives the Government has in dealing with them.

Question. What are the primary motives of the ship repair industry?

The contractor representatives interviewed agreed their primary motives are the standard motives of industry: 1) socio-economic considerations, 2) firm perpetuation, 3) profit maximization, and 4) sales maximization. It should be noted that these motives are not ranked in importance.

Question. What are the most influential factors of incentive contracts with respect to motivating the ship repair industry?

The response to this question was the ability of the contractor to increase profit and the ability to make trade-offs between performance and schedule.

This response is supportive of incentive contracts, but the contractors failed to cite another reason which would occur as a result of incentives; namely, an increased return on investment for the contractor. The possibility of an increased return can be very appealing to industry, especially when explaining to stockholders how "their" money is being used and how much return the stockholder's money is receiving.

Question. What would you recommend as an alternative or addition to, the present firm fixed-price contract the U.S. Navy presently uses for their ship repair, that would sufficiently motivate you to complete an overhaul on or ahead of schedule, despite the fact that "growth work" has caused delays?

Only one of the contractors stated that a cost type contract would resolve the present dilemma in ship repair. A CPIF contract was tendered by the contractor as the only means of helping the contractor to meet the schedule and stop ruthless bidding. As stated in previous paragraphs, CPIF contracts are not necessarily motivating the contractor to get the ships out of the yard any sooner. The contractors did have some views and ideas regarding the present system which were felt important to examine, regardless if the MSR is incentivized or not. These comments are summarized below:

a. There should be greater emphasis (by the U.S. Navy) to even out the ship repair work load. All contractors interviewed felt that if there was a constant input of repair work, the contractors would be able to keep a steady work force (thereby retaining key employees), would be able to improve the skills of their other workers, would eliminate ruthless bidding, would provide better competition, and would result in ships not being delayed and create a better atmosphere between the Government and the contractor.

Under the miscellaneous comments regarding the MSR, the above item is a very important point to raise, however, this is just a regional problem. After interviewing people from various parts of the country, it was concluded that this fact does not exist on the East Coast and Gulf Coast.

b. Retention fees should be re-evaluated. Since the company has already been determined as responsive, it seems unnecessary to hold back large sums of money when only minor discrepancies exist. In large contracts, retention fees force the contractor to borrow money which adds greatly to his contract costs. Retention fees should be reduced, eliminated, or revert to a diminishing scale, dependent on the size of the contract. The Government should also be forced to disclose the amount of money it is retaining at the end of the overhaul.

Clause 8 (see appendix) of the MSR contract entitles contractors to periodic payments based on the percentage of completion of the overhaul or the repair work. The purpose

of the progress payments is to provide working capital for the contractor. This clause also requires the Contracting Officer to withhold 10 per cent of the value of the progress payments. This amount is paid upon successful completion of the contract. This deduction is known as a retention fee. Retention fees discussed above may be a major problem while under the guarantee period, but these fees are a means of control by the contract administrator. This action may cause the contractor to borrow money, but the contractor is aware of this before the contract is awarded. Besides, the contractor can set up preliminary funds before the overhaul to "cover" these retained funds and does receive progress payments which is to his advantage.

c. The Government should extend a contract rather than force the contractor to pay overtime rates.

This response is most curious, especially since all the contractors admit that the longer a ship is kept in their yard for repair, the more contractor "out of pocket" costs are incurred.

d. Material constraints are often the causes of delays in ship repair. Longer lead-time items should be ordered earlier than the present directives dictate.

This comment has merit and should be considered by the Government in future dealings with contractors.

e. The contract training for Government and contractor representatives should be at the same place in order to increase a better understanding of the ship repair system.

The above has merit and should be considered by the Government in future dealings with contractors.

f. The completion date for a ship should be bilaterally made by the Government and the contractor at a joint meeting. When dates are agreed upon, the Program Evaluation and Review Technique (PERT) or the Critical Path Method (CPM) methods should be used to monitor the overhaul by both the Government and the contractor.

The ideas presented under the above seem to be contradictory to fact since completion times are negotiated. This is evidently an outgrowth of the changes clause which most contractors are against.

g. The majority of the ships crews should be taken off the ship in the yards. A skeletal crew can remain as agents of the Government. With the entire crew present, much disruption occurs, and it finally leads to a crew with poor morale and to decreased output from the contractors.

This suggestion has merit and should be considered by the Government in future dealings with contractors.

h. The Navy inspector's stop repair work when they do not have the power to do so. They have the power to advise, but not halt work.

The above discloses a major problem area; namely, unauthorized work stoppages. There is no excuse for unauthorized stoppages, but contractor quality assurance (QA) systems might stop work anyhow without intervention by Government inspectors.

i. The changes clause is too unilateral. Contractors should have an input and state when job orders cannot be done in the allowed time frames.

Even though the changes clause is a unilateral undertaking, the contractor can request an extension, authorize overtime, or cancel. This statement appears to be "uncalled for" since the contractor does have an alternative.

j. Maximum price job orders should only be issued to low priority work which can be eventually canceled if necessary. Sometimes when maximum price job orders are input into the system, the Government and contractor estimates do not agree. It is later changed to a modification and eventually negotiated. This present system wastes both the Government's and the contractor's time.

The above is strictly a statement of the contractor's wish to "get-well" on change orders. Pre-priced change orders are not appealing to the contractor since it is easier to cover costs and mistakes by an after-the-fact priced change order where actual costs incurred are discussed, vice estimated costs. The contractor loses any leeway when dealing with pre-priced change orders. This procedure is advantageous to the Government and should not be changed.

k. The guarantee clause of the MSR is costly to the contractor. Ships are in the yards as long as a year. Some of the equipment has been repaired early in the overhaul, but the contractor must continually go back to the equipment

to ensure it works well and must continue repair work 60 days after the completion date. Since both the crew and the contractor operate the equipment, the 60 day guarantee period should begin when the equipment is deemed completed or when the crew makes it operational. Overhauls now cover a long period of time and so maintenance of gear this length of time is very costly.

Guarantee period is a topic which has some merit at first glance, but is not so simple upon further observation. Since the Government pays reasonable prices for a good product, there should be no reason why the Government should expect this product to last only the first few months of the overhaul. If the views presented by this argument are implemented, theoretically, the Government could accept a ship (upon completion of repairs) whose equipment is not functioning properly when deployed. The Navy presently experiences problems with equipment upon completion of the overhaul. If the guarantee clause were changed, the results could be devastating with respect to a quality product that operates correctly upon completion of the overhaul.

1. The clause on inclement weather places the contractor at a disadvantage, especially if delays in shipment for Government furnished material necessitates work to begin during bad weather. Due to advanced weather forecasting this clause should be subject to removal on a year to year basis, dependent upon the expected weather.

Loss of schedule due to bad weather is a weak reason for eliminating the inclement weather clause since the contractor does get a day for day extension of the schedule as a result of inclement weather. Weather is beyond the control of the Government.

m. A conference should be held between ship personnel and the contractor during the period beginning after the award of the contract, and commencing before the ship arrives, to go over pertinent data

A Post-Award Conference has merit and should be considered by the Government in future dealings with contractors.

n. A conference should be held upon completion of the overhaul in which the Government and the contractor evaluate the overhaul so that there can be lessons learned and complete honesty about past mistakes

A Post-Overhaul Conference has merit and should be considered by the Government in future dealings with contractors.

o. Contractors should be paid for estimates. It is a very costly proposition, especially under the present system where the contractor must prove his estimate and the Government does not.

Contractors do get reimbursed for estimates if awarded the contract. Contractors are not required to bid, and should not bid if they are unwilling to take the risk of not winning, and hence not being reimbursed for estimates.

p. There should be an automatic formula of granting extra days delay in the yards proportional to the size of the contract.

The driving force behind this contractor statement is that contractors are cramped for time during each overhaul. With an inordinate amount of changes and modifications, this may be true, but SUPSHIPS does grant "extra days delay" when considering changes.

q. The Government Project Manager for a ship should have greater contracting authority. The authority should be increased both in scope and in dollar threshold.

This suggestion has merit and should be considered by the Government in future dealings with contractors.

r. The time it takes to process a modification should be lessened. Too many contractor hours are wasted waiting for approval to continue work.

The above has merit and should be considered by the Government in future dealings with contractors.

6. NAVSEA Procedures

Further investigation of the MSR problem (i.e., delivery schedule) was conducted with various individuals from NAVSEA. NAVSEA is presently using a FPI contract for the overhauls of the 1052 Class Frigate. The incentives are associated with the overhaul milestones. The reason for basing the incentives exclusively on schedule was to stress the importance of meeting scheduled delivery dates (including certain

milestones) to the contractor. It should be noted that NAVSEA also realizes that the milestones must be realistic, and that the change orders (including both numbers of change orders and type of change orders) must be controlled. The "milestone events" which are subject to incentive payments are:

- a. Dry Dock
- b. Reports
- c. Undock
- d. Pre-LOE Examination
- e. Dock Trials
- f. Redelivery of Vessel

The dates will be "equitably adjusted" should delays occur which are beyond the control and without fault and negligence of the contractor. The overall thrust of the incentive is to provide a monetary reward if the contractor intensifies his management efforts in controlling and managing his work force and production scheduling.

NAVSEA is also looking at other problems regarding overhauls. There is a steering committee for "improvement of overhauls in the private sector" which has presented a plan of action as well as milestones at which the recommendations should be implemented or completed. The program elements of the steering committee covered topics as: contracting methods, overhaul planning, quality of work, organization and staffing, and problem identification. Due to the length of this plan and the fact that many of the subjects of the plan do not have a direct bearing on this thesis, the plan

will not be discussed. However, in Chapter 6, references will be made to this plan and how this plan differs from the proposals of this thesis.

D. SUMMARY

From the data presented in this chapter, it is apparent that the solution to the ship repair schedule problem is not clear-cut nor obvious. Even though many experienced people were contacted, no particular, all-encompassing solution did surface. In fact, the only unified response was that a change is needed, but what this change was and a means of accomplishing this change was not provided. NAVSEA is presently working on a plan which may alleviate some of the overhaul problems. The following section will present an alternative plan which can be implemented should NAVSEA's plan fail to resolve the issues previously discussed.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

Even though NAVSEA is using a FPI contract in the overhaul/repair of ships, the success of this recent attempt still remains to be verified. As stated in the previous chapter, no consensus (from the people in the field - SUPSHIP activities) was reached regarding a successful course of action (i.e., FPI, CPAF, etc.). A majority of the personnel felt that properly incentivized contracts would improve the delivery of ships as originally scheduled. The present work of NAVSEA on FPI contracts coupled with the field activity representative responses indicate that incentives will work and lend support to the initial hypothesis and point to the fact that a monetary incentive may be the only reasonable motivation left for the Government to instill some urgency into the management of a contractor. It is therefore concluded that a FPI contract or a Fixed Price Award Fee contract can be used by the Government to motivate the contractor to meet scheduled delivery dates of ships in overhaul. The CPAF contract was not judged to be a viable alternative due to the extra personnel needed to monitor costs as well as those required to monitor and determine the award amount. This type of contract would pose too much of a strain on the system's resources in terms of administrative costs and the increased numbers of personnel which would have to be immediately input into the system.

This conclusion is supported in part by the interviews done with contractors and ship repair personnel and the fact that NAVSEA is presently using an incentive contract with a certain class of ship. It is important to point out that even though an incentive contract is being used, recommendations for additional actions and the plan for the FPAF contract will be proposed, should present methods (FPI contract) prove ineffective.

B. STRENGTHS AND LIMITATIONS OF THIS STUDY

The thrust of the research indicates the participants spoke as individuals concerned with the problem and seeking its solution, and not as the "sounding boards" of the various commands associated with ship repair work. The opinions expressed by the personnel interviewed were stated in honesty and without fear of being quoted which is a strong indication that the participants were not apprehensive nor fearful of their own convictions.

A major limitation of this study is that the contractors were from one region and may not express the majority opinion of the ship repair facilities around the United States. However, items which appear to be strictly regional problems were labeled as such (in this text) and dealt with in that manner (as a strictly regional problem).

C. RECOMMENDATIONS

The following recommendations are provided as a possible means of combating the ship repair problem should present attempts fail.

Recommendation 1:

THAT THE MASTER SHIP REPAIR CONTRACT AND THE SHIP REPAIR CONTRACTING MANUAL (REPAIR MANUAL) BE REVISED TO ELIMINATE THE PREFERENCE FOR FORMALLY ADVERTISED FIXED-PRICE JOB ORDERS.

Policies should emphasize the importance of choosing from other contract types which are in the existing spectrum of contracts (i.e., FPI or FPAF), that type or combination of types best suited to the particularity of the procurement. The Contracting Officer would thus be given more latitude in constructing contracts. Since the PCO finds himself within a narrow framework when coping with the repair scenario; the way it has always been done is frequently more attractive than innovative procedures to "better" do the job. Thoughts of finding the "one best way" should be discarded and consideration of optimizing each individual procurement should be paramount. Even though a FFP contract has the advantages of: 1) the contractor assuming the risk, 2) profit provisions motivating the contractor to control costs and achieving prescribed performance levels, and 3) the profit motive substituting for Government administration and surveillance, the continued uses of this type of contract (FFP) in ship repair is no longer appropriate. The reason for this fact is that a FFP contract requires definite specifications (so the degree of risk can be assessed) and allows only a limited number of change orders. The lack of adequate specifications and a large number of change orders rule out the use of a FFP and indicate the use of some type of incentive contract.

Recommendation 2:

COMBINATION OF CURRENT METHODS AND NEW INNOVATIVE METHODS SHOULD BE ENCOURAGED AS LONG AS THE METHODS ARE BASED ON SOUND JUDGEMENT

One single method used in exclusion (i.e., firm fixed-price job orders) can seldom do a complete task of incentivizing the contractor, except in the simplest overhauls. By allowing some leeway for the contracting officer, contract type can be a matter of negotiation.

Recommendation 3:

TO INCREASE MANNING LEVELS AT SUPSHIP ACTIVITIES TO MEET THE ADDED WORKLOAD CAUSED BY INCENTIVE CONTRACTS.

This should be done on a temporary basis until the contract administration personnel are at ease in the incentive arena. Many years of dealing strictly with FFP contracts tends to dampen their potential. This recommendation is posed merely as a "stop gap" procedure until expertise is brought up to a necessary level.

Recommendation 4:

A STUDY GROUP SHOULD BE APPOINTED TO ASCERTAIN WHETHER ALL PAPERWORK GENERATED AND REQUIRED BY SUPSHIP ACTIVITIES ARE ACTUALLY NECESSARY. THIS STUDY SHOULD ATTEMPT TO IDENTIFY WHICH PAPERWORK CAN BE AUTOMATED.

After completing the interviews with both the contractors and contract administrators, it became readily apparent that there is a strong possibility that the bureaucratic paper flow may be the cause of much delay in the overhaul process, and that this delay is often unnecessary. If certain requirements

are computerized, needed reports can be routinely generated by the computer.

Recommendation 5:

THE PRE-OVERHAUL TEST AND INSPECTION (POT&I) PERIOD SHOULD BE SCHEDULED CLOSER TO THE OVERHAUL COMMENCEMENT.

The POT&I is probably the most important factor in the development of a clear and explicit work package. The purpose of the POT&I is to verify equipment problem areas through special test procedures. With a POT&I date scheduled closer to the beginning of the overhaul, there won't be a large amount of additional requirements generated between the testing period and work commencement (which causes schedule slippages). If the work package is more well-defined and current, growth work will not hamper overhaul operations as it presently does. NAVSEA is recommending a plan for a dedicated POT&I period to the CNO which will help alleviate the problem. NAVSEA also has a contingent plan to possibly insert a "mini" POT&I before the overhaul to cover the period between the scheduled testing period and the overhaul. If, in fact, this smaller inspection is used, work packages problems may be significantly eliminated.

Recommendation 6:

CONTINUE TO USE INVITATION FOR BIDS (IFB) VICE REQUEST FOR PROPOSALS (RFP).

The MSR presently requires an IFB (except where the scope of the work cannot be defined) to increase competition. NAVSEA is recommending that RFP's be used in future dealings with the proposed FPI contract. Until there is a better understand-

ing of the new process, IFB's should be used since an RFP can eliminate the small contractor who is able to accomplish the work but is not sophisticated enough to provide an adequate RFP. By using an RFP, the base of support can be gradually eroded until the small contractor will not be able to present a proposal that will appear as all-encompassing as one from a large contractor. The result is that the smaller business will eventually be eliminated from negotiations.

Recommendation 7:

STANDARD SPECIFICATIONS SHOULD BE WRITTEN FOR ROUTINE FUNCTIONS TO ELIMINATE THE "GREY AREA" DRAFTED INTO MANY SPECIFICATIONS BY THE ORIGINATORS.

NAVSEA is now trying "to increase SUPSHIP productivity and reduce contractor effort in preparing bids through the use of standard specifications."³²

"A Standard Specification for Ship Repair and Alteration Committee (SSRAC) was established to develop, revise and control the standard specifications. Individual SUPSHIPS generally along central overhaul planning assignment responsibilities were tasked to develop the specifications."³³

If standard specifications are created, much lost time and delay due to faulty information will be eliminated. The result will be a smoother overhaul period. Should the various SUPSHIP activities run into problems fulfilling this task, private companies can be contracted to complete the requirement.

Recommendation 8:

THE GOVERNMENT SHOULD OPEN GOVERNMENT TRAINING FACILITIES TO CONTRACTOR "ACQUISITION" PERSONNEL TO INCREASE THE AWARENESS OF GOVERNMENT AND CONTRACTOR PROBLEMS AND TO FACILITATE COMMUNICATIONS.

By having both the contractor (who would reimburse the Government for the training services provided) and the Government acquisition personnel train at the same facilities, a dialogue can be created to alleviate procedural problems that arise. Arguments opposing this idea believe that the purpose of legal counsel is to solve problems originating because of differing interpretations of a contract. It is of the opinion of this writer that it is to the benefit of the Government to avoid litigation whenever possible. NAVSEA is recommending that selected trades of the repair industry be improved through the Job Corps under the Comprehensive Employment and Training (CETA) program. This idea, coupled with the above recommendation, should improve both the contractor's work ability and contract administration.

Recommendation 9:

ONLY A SKILLED SKELETAL CREW SHOULD REMAIN ONBOARD A SHIP IN OVERHAUL.

These crew members should be carefully screened so that this skeletal crew is well versed in equipment and shipboard requirements. With only a chosen few remaining, the contractor will not be able to cite disruption by the crew as a reason for delay of schedule. The members departing the ship can either be sent to training facilities to increase

their abilities or be transferred to other ships coming out of the yards. By using only a limited number of men, manpower will not be wasted waiting for equipment to be repaired by the contractor, nor will men stand idle while their work space is being worked upon by the contractor. The effect is a better utilization of manpower. A recent article in the Wall Street Journal concerning the overhaul of the U.S.S. Saratoga alluded to the fact that small nucleus crews have great advantages. The advantages were not specified but it can reasonably be assumed that smaller crews mean a maximization of the crews ability, decreased costs for crew support, and less disruption caused between the contractor and the Government.

Recommendation 10:

THE NAVY SHOULD DETERMINE RESPONSIBILITY FOR
DISRUPTION COSTS BY ACCOMPLISHING A DETAILED
STUDY IN THIS AREA.

Disruption means to cause turmoil or disorder. Disruption costs "is the difference between the actual cost for a program on the one hand, and the cost 'reasonably required' to perform the task and construct the hardware in the configuration finally delivered to the customer, on the other."³⁴ This idea, heralded by Mr. E. B. Cochran, has three reasons as the causes of disruption: force majeure, concurrency of product development (or design) and production, and inadequate planning and management.

"Force majeure covers such catastrophic outside events as a natural disaster, civil disorder, major strike, fire, etc. Concurrency of design and production disrupts an organization by introducing the uncertainty inherent

in the design process ... Good planning and management is of great importance to a new program. The task may be well understood and thoroughly planned at the onset, adequate resources of men, materials, facilities and money must be available at the appropriate times and the program must be administered with suitable precision and detailed control over operations."³⁵

Even though the concurrency problem is not applicable in the ship repair scenario, the other basic causes do pertain to this situation. Factors such as time compression, labor disruption, conflicts of scheduling, conflicts of crew size (i.e., the contractor's crew size), delays in design, material, facilities, changes in design, production procedures, unrealistic estimating, misrepresentation of tasks by the Government or the contractor, specification changes, failure to issue necessary data, misleading or erroneous information, interferences with contractor's vendors or employees, poor internal planning, etc. can be determined for an overhaul and those percentages can be applied to claims filed by contractors. The ability to scientifically state how a certain type of disruption affects contractor performance, and declaring approximately how many dollars these disruptions equate to are most important in the claims area. This fact is especially true since contractors are now using such things as inefficiency studies done by the Department of Labor in 1947 to support their claims. Since the Department of Defense (DOD) " ... faces a highly determined, technically competent opponent which focuses vast and increasing resources consistently on its long-range imperialistic objections ..."³⁶, it is imperative that the

Department of the Navy be able to determine the costs of disruption so as to prevent needless delays of ships in overhaul.

Recommendation 11:

TYCOM APPROVAL OF ADDITIONAL WORK AFTER THE COMMENCEMENT OF THE OVERHAUL SHOULD BE LIMITED ONLY TO REPAIRS WHICH AFFECT THE MISSION OF THE SHIP.

This recommendation is not attempting to blame any organization or individual for randomly approving any job order without forethought, but is trying to disclose the fact that if only high priority items are approved, much growth work can be eliminated from each overhaul. Non-essential items can be postponed to later availability periods. With decreased job orders, contract administration functions can be more easily accomplished.

Recommendation 12:

STABILIZE THE WORK LOADS IN THE VARIOUS REGIONS OF THE COUNTRY TO MAINTAIN A MOBILIZATION BASE AS WELL AS KEEPING A BASELINE OF EMPLOYEES AT EACH CONTRACTOR.

Acknowledging the fact that different portions of the country have different labor rates (hence varying costs of ship repair) and some portions are therefore more appealing than others to accomplish an overhaul, it should be pointed out that a mobilization base must be preserved. Current practices seem to inundate regions with work while depleting others. True, this may be classified as a regional problem, but while certain regions are being used, and others not, workers will leave contractors in the depressed areas. The result is a weakening

of the contractors of that region and the base of support. By keeping a steady to moderate influx of work into an area, a contractor's work force will be stable. This work force will improve its skills by performing similar work on similar equipment. In time, the contractor will experience a learning curve. The result will be decreased costs for the Government in the future.

Recommendation 13:

GOVERNMENT FURNISHED MATERIAL (GFM) SHOULD BE RE-EVALUATED AND STUDIED TO SEE IF SOME OF THE MATERIAL CURRENTLY PROVIDED BY THE GOVERNMENT COULD BE BETTER FURNISHED BY THE CONTRACTOR.

The intent of this recommendation is not to have the contractor furnish ammunition or major weapons systems but rather to make the contractor responsible for items (i.e., gages, certain valves, etc.) which can be more readily obtained by the contractor at his locale which still satisfy military specifications and do not take as much time (and possibly at a decreased cost) to acquire as might occur if the Government procures such material. This is not passing judgement on the Government acquisition process. It is just stating the fact that certain materials may be obtained at a decreased cost, locally, by the contractor. The result would be shorter lead times than can be expected if the Government formally advertises a procurement.

Recommendation 14:

ENCOURAGE A "LESSONS LEARNED" CONFERENCE AFTER EACH OVERHAUL BETWEEN THE GOVERNMENT AND THE CONTRACTOR.

This conference is recommended solely as a means of improving Government/contractor communications. If a meeting were held where differences can be aired without fear of litigation, problem areas can be resolved. With continual feedback after each overhaul, a dialogue will be created which can stifle petty issues and allow the flow of information to continue, as well as permit overhauls to proceed with speed and surety.

Recommendation 15:

A STUDY SHOULD BE CONDUCTED TO DETERMINE IF THE DOLLAR LIMITATIONS ON AUTHORITY FOR SUPERVISORY INSPECTORS OR SURVEYORS SHOULD BE INCREASED.

This study should be addressed with the understanding that all individuals in charge of work at contractors' plants are not capable of executing supplemental agreements of increased dollar value. The recommendation is made merely to alleviate congestion areas in the overhaul process. The purpose is not to usurp the ACO's authority but to provide an avenue of acceleration whereby capable inspectors or surveyors can keep the overhaul on track, without having to revert back to SUPSHIP or NAVSEA for approval.

Recommendation 16:

THAT THE FIXED PRICE AWARD FEE CONTRACT BE CONSIDERED AS A "CURRENT METHOD" OR, AT MINIMUM, AS AN "ALTERNATE METHOD" OF ACCOMPLISHING SHIP REPAIR.

This contract type can be used as a viable alternative to the FFP contract or the FPI contract currently being used as a test case. An award type of contract allows flexibility to the contract administrators.

"The flexibility in the award fee provision ... stems essentially from three factors: (1) the subjective nature of the performance evaluation process, (2) the buyer's right to change or modify areas to be considered for performance evaluation and (3) the versatility with which the amount of the award fee can be distributed over the life of the contract."³⁷

The award fee will ensure that "communications between the buyer and supplier ... be equal or better than that under other types of contracts."³⁸

The award fee provision will be the major element to motivate the contractor to provide superior contract performance. The actual award pool should range from two to ten per cent (these figures can be changed) of the fixed-price portion of the contract. The percentages will vary according to how difficult the overhaul will be and how urgent it may be to get the ship out early from the yard period.

In evaluating the contractor's performance on individual ship overhauls, the following major areas should be considered (the weights of each area should be dependent upon the "needs of the Navy" at that point in time):

- 1) Responsiveness (schedule)

- a) Delivery of product- dependent upon the ability of the contractor to meet all milestones. This takes into consideration the contractor's adherence to the overall plan,

notification of the Government in case of changes and the number of changes generated by the Government or the contractor.

b) Submission of data and reports

(1) adherence to schedule

(2) the quality of the reports themselves

2) Quality of the final product

a) Conformance to specifications

b) Quality Assurance (QA) system (plans and staffing)

c) Contractor responsiveness to correct QA infractions. This is tied-in directly to the repair "reject" rate, the number of waivers (if needed), or trouble and failure reports, etc.

The weights of each major area (i.e., responsiveness and quality) can vary between 20-60 per cent, dependent upon the relative importance of mission success. These major areas can also be changed and the Government can emphasize new items. For example, present trends show that value engineering change proposals are not being submitted. True, there is only a limited area in ship repair where changes of this nature can be applicable, but should value engineering be incentivized, possible decreased life-cycle costs may be obtained in the future.

The contractor's performance should be evaluated quarterly. The performance evaluation/award fee determining board can be composed of the ship's Project Manager (ship supervisor), surveyors, and contracting personnel. Of course, recommendations for award fee must be reviewed by higher authorities (ACO, PCO, NAVSEA) and will not be subject to the Disputes Clause.

The use of a FPAF contract is provided merely as an alternative. Due to the newness of the FPAF contract and the fact that people are not familiar with it, a pilot study can be done (should the FPI contract fail) to see if this type of contract is a feasible means of contracting for ship repairs.

The beauty of the FPAF is that the work to be accomplished is treated as a regular FFP contract, the award being the mechanism by which the Government can motivate increased communications and performance for a moderate cost.

"The use of an award fee motivates people. Interaction between Government and contractor personnel occurs at all levels between management and workers. The interaction of the fee determining official and contractor management flows down to workers as a result of the communication process which must be established if the contractor is to earn the award fee."³⁹

Questions are raised that the administrative costs may be prohibitive. Before the ACO personnel are trained, this may appear to have substance, though once the system is understood by both the Government and the contractor, routines will be developed which will not equate to present "disruption costs."

Other factors discussed state that "the award fee provision may be counter-productive if the fee award is not promptly made at the end of the evaluation period."⁴⁰ This item will be a problem area if ACO personnel fail to follow the contract format. Constant and special attention to this area will alleviate the problem.

"Timely evaluations and communications covering performance progress are essential to obtaining the motivation desired ... Therefore, if the evaluation periods for award fee determinations and payment extend over several or many months, interim evaluations may be provided and discussed with the contractor. Studies have shown that the frequency of the evaluations and communication of interim ratings are more important as a motivator to the contractor than the formal fee award."⁴¹

The Government thus will have a flexible, management tool to accomplish an overhaul.

"Through the use of regular evaluations that are documented and provided to an influential executive within the contracting organization, an explicit control feed back loop is established at a high management level. This high level feed back from the buyer to the seller generates additional vertical communications within the organization and results in management actions to reconcile problems or reward high performance. The formal feedback mechanism, by its presence, tends to break down barriers to communication and cooperation at all levels, leading to performance improvements within contractor and Government organizations."⁴²

D. SUMMARY

This study has suggested that incentives can be used effectively in the repair scenario. Informal interviews and present NAVSEA actions indicate that the MSR can be effectively incentivized. The recommendations in this chapter were tendered to provide a means of improving existing conditions. Each recommendation should be considered when devising a uniform package to incentivize the MSR. It is not just a one-step process. Many areas and topics must be

addressed before a solution is obtained. The combination of current methods and new innovative methods should be encouraged to be implemented to resolve on-going issues. One single method used in exclusion of all others can seldom do a complete job of incentivizing the contractor, except on the simplest programs. This whole process will take much time, but a long journey is started by the first step. This study has provided a first step.

APPENDIX A

- CLAUSE 1. Purpose and Precedence
- CLAUSE 2. Preliminary Arrangements
- CLAUSE 3. Job Orders and Compensation
- CLAUSE 4. Performance
- CLAUSE 5. Inspection and Manner of Doing Work
- CLAUSE 6. Changes
- CLAUSE 7. Extras
- CLAUSE 8. Payments
- CLAUSE 9. Government Property (Fixed-Price)
- CLAUSE 10. Liability and Insurance
- CLAUSE 11. Guarantees
- CLAUSE 12. Title
- CLAUSE 13. Discharge of Liens
- CLAUSE 14.
- CLAUSE 15. Default
- CLAUSE 16. Termination For Convenience of the Government
- CLAUSE 17. Disputes
- CLAUSE 18. Patents
- CLAUSE 19. Buy American Act
- CLAUSE 20. Delays
- CLAUSE 21. Convict Labor
- CLAUSE 22. Contract Work Hours Standards Act - Overtime Compensation
- CLAUSE 23. Walsh-Healey Public Contracts Act
- CLAUSE 24. Department of Labor Safety and Health Regulations for Ship Repairing
- CLAUSE 25. Equal Opportunity
- CLAUSE 26. Officials Not to Benefit
- CLAUSE 27. Covenant Against Contingent Fees
- CLAUSE 28. Bonds
- CLAUSE 29. Interest
- CLAUSE 30. Renegotiation
- CLAUSE 31. Notices
- CLAUSE 32. Period of the Contract
- CLAUSE 33. Notice to the Government of Labor Disputes
- CLAUSE 34. Military Security Requirements
- CLAUSE 35. Gratuities
- CLAUSE 36. Examination of Records by Comptroller General
- CLAUSE 37. Utilization of Small Business Concerns
- CLAUSE 38. Utilization of Concerns in Labor Surplus Areas
- CLAUSE 39. Priorities, Allocations and Allotments
- CLAUSE 40. Assignment of Claims
- CLAUSE 41. Duty-Free Entry - Canadian Supplies
- CLAUSE 42A Price Reduction for Defective Cost or Pricing Data
- CLAUSE 42B Price Reduction for Defective Cost or Pricing Data-Price Adjustments
- CLAUSE 43A Audit by Department of Defense
- CLAUSE 43B Audit - Price Adjustments
- CLAUSE 44A Subcontractor Cost and Pricing Data

- CLAUSE 44B Subcontractor Cost and Pricing Data - Price Adjustments
- CLAUSE 45. Small Business Contracting Program
- CLAUSE 46. Value Engineering Incentive
- CLAUSE 47. Labor Surplus Area Subcontracting Program
- CLAUSE 48. Definitions
- CLAUSE 49. Payment of Interest on Contractors Claims
- CLAUSE 50. Listing of Employment Openings
- CLAUSE 51. Pricing of Adjustments
- CLAUSE 52A Cost Accounting Standards
- CLAUSE 52B Administration of Cost Accounting Standards
- CLAUSE 53. New Material
- CLAUSE 54. Required Sources for Miniature and Instrument Ball Bearings
- CLAUSE 55. Government Surplus
- CLAUSE 56. Preference for Domestic Specialty Metals (Major Programs)
- CLAUSE 57. Utilization of Minority Business Enterprises
- CLAUSE 58. Minority Business Enterprises Subcontracting Program
- CLAUSE 59. Clean Air and Water
- CLAUSE 60. Subcontracts
- CLAUSE 61. Equal Opportunity Pre-award Clearance of Subcontracts
- CLAUSE 62. Required Sources for Jewel Bearings
- CLAUSE 63. Required Sources for Precision Components for Mechanical Time Devices
- CLAUSE 64. Federal, State and Local Taxes
- CLAUSE 66. Affirmative Action for Handicapped Workers

FOOTNOTES

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